

Patent Claims

1. An apparatus for applying semiconductor chips (5) to a plurality of substrates (4), in particular smartcard modules or flexboards, wherein at an adhesive application device (1) adhesive is applied to the substrate (4) at predefined substrate positions, at a fitting device (2) the substrate (4) is fitted with the semiconductor chips (5) at the substrate positions, and in a curing device (3, 3a, 3b, 3c, 3d) the adhesive is cured, characterized in that the curing device (3, 3a, 3b, 3c, 3d) and/or a further device can be connected by a clamping device (13, 14) to a conveyor belt (6) which transports the substrates (4) along the devices, and can be moved in the transport direction, at a transport speed of the conveyor belt (6), by a lifting device (15).

2. The apparatus as claimed in claim 1, characterized in that, in the curing device (3, 3a, 3b, 3c, 3d) and/or the further device which can be connected to the conveyor belt (6), a plurality of processing and/or control units (19) are arranged in the transport direction of the conveyor belt (6), which processing and/or control units carry out simultaneous processing and/or control of the substrates (4) fitted with the semiconductor chips (5) as they are transported.

3. The apparatus as claimed in claim 2, characterized by a timer device for setting a time duration which corresponds to the sum of a processing and/or control time of a processing and/or control unit (19) and a time period which is required to return the moved curing device (3, 3a, 3b, 3c, 3d) and/or the further device to a starting position in a direction counter to the transport direction.

4. The apparatus as claimed in claim 3, characterized in that arranged in the curing device (3, 3a, 3b, 3c, 3d) and/or the further device are the same number of processing and/or control units (19) as the number of substrates (4) moving in the transport direction which can be fitted by the fitting device (2) at a predefined fitting speed within the processing and/or control time.

5. The apparatus as claimed in any of the preceding claims, characterized in that the movable curing device (3, 3a, 3b, 3c, 3d) comprises a thermode array (18) arranged above the conveyor belt (6), said thermode array comprising a plurality of thermodes assigned to the substrate positions of the substrates (4), and at least one heating plate (21) arranged below the conveyor belt (6).

6. The apparatus as claimed in claim 5, characterized in that the thermode array (18) and the heating plate (21) can be moved by a slide device in a direction perpendicular to the plane of the conveyor belt in such a way that, with the clamping device (13, 14) closed, they can be moved toward the conveyor belt (6) and away from the conveyor belt (6).

7. The apparatus as claimed in any of the preceding claims, characterized in that the clamping device comprises at least two clamping jaw units (13, 14) which are preferably arranged at end regions of the movable curing device (3, 3a, 3b, 3c, 3d) and/or of the further device, the upper and lower clamping jaws (24a, 25a; 24b, 25b) of which can be guided toward the conveyor belt (6) from above and below.

8. The apparatus as claimed in any of the preceding claims, characterized in that the lifting device (15) is connected to a conveyor belt drive for moving the conveyor belt in a step-wise manner in the transport direction.

9. The apparatus as claimed in any of claims 3 to 8, characterized by a further clamping device (23), fixed to the apparatus, for keeping the conveyor belt (6) stationary while the moved curing device (3, 3a, 3b, 3c, 3d) and/or the further device is being returned in the direction counter to the transport direction.

10. A method for applying semiconductor chips (5) to a plurality of substrates (4), in particular smartcard modules or flexboards, wherein at an adhesive application device (1) adhesive is applied to the substrate (4) at predefined substrate positions, at a fitting device (2) the substrate (4) is fitted with the semiconductor chips (5) at the substrate positions, and in a curing device (3, 3a, 3b, 3c, 3d) the adhesive is cured, characterized by the following steps:

- connecting the curing device (3, 3a, 3b, 3c, 3d) and/or a further device to a conveyor belt (6) which transports the substrates (4) along the devices, by closing a first clamping device (13, 14);
- opening a second clamping device (23), fixed to the apparatus, so as to release the conveyor belt (6) moving in the transport direction;
- moving processing and/or control units (19) arranged in the curing device (3, 3a, 3b, 3c, 3d) and/or the further device into a closed position in a direction perpendicular to the plane of the conveyor belt;
- moving the curing device (3, 3a, 3b, 3c, 3d) and/or the further device at a transport speed of the conveyor belt (6) in the transport direction during a simultaneous processing and/or control of a plurality of substrates (4) fitted with the semiconductor chips (5) for a predefined processing and/or control time by means of the processing and/or control units (19);

- moving the processing and/or control units (19) into an open position away from the plane of the conveyor belt following expiry of the processing and/or control time;
- closing the second clamping device (23) which is fixed to the apparatus;
- opening the first clamping device (13, 14);
- returning the curing device (3, 3a, 3b, 3c, 3d) and/or the further device to a starting position in a direction counter to the transport direction.

11. The method as claimed in claim 10, characterized in that the step of moving the processing and/or control units (19) into an open position can be carried out independently of a movement of the conveyor belt (6) in the transport direction.

12. The method as claimed in claim 10 or 11, characterized in that the transport speed corresponds to a fitting speed at which the substrates (4) on the conveyor belt (6) are fitted, said conveyor belt moving in a step-wise manner.